

A successful strategy for energy efficient public buildings

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Abstract

The regional government of Upper Austria made a commitment to increase energy efficiency in public buildings by 1.5 % per year. This target is part of the Upper Austrian energy efficiency strategy which includes a number of measures to support different target groups in implementing energy efficiency measures. The O.Ö. Energiesparverband, the energy agency of Upper Austria, is responsible for the implementation of most of the measures included in the energy efficiency strategy. The activities include among others awareness raising, minimum energy performance requirements and benchmarking, energy accounting and monitoring, Third Party Financing, training, seminars and competitions, publications. Results of the annual benchmarking and monitoring for buildings owned by the regional administration show for example that the energy consumption per m² (heating & hot water) decreased by 18.5 % since 1994.

Background

Energy efficiency (EE) and renewable energy sources (RES) have been cornerstones of the Upper Austrian energy policy for many years. In 1993, the first Upper Austrian energy strategy and action plan was passed. The first phase – from 1994 to 2000 - led to an increase of renewable energy sources from 25 to 30 % – of which 14 % was hydro (the traditional RES), 14 % biomass – wood – and 2 % solar energy and other RES.

Energy consumption of new buildings (one family homes) was reduced by 30 %. Energy efficiency in this period was increased by 1 % annually and more than 10,000 jobs were created and/or secured.

For the present decade, the energy strategy also sets a number of very concrete goals: to double solar and biomass, increase EE by 10 % and create 1,500 new jobs.

Upper Austria was also one of the first European regions to implement the European Directive on “energy end-use efficiency and energy services” by passing an energy efficiency strategy in November 2004, which aims to increase energy efficiency by 1 %, by 1.5 % in the public sector respectively.

Based on the Upper Austrian energy strategy and implemented by O.Ö. Energiesparverband, the regional energy agency, a programme for triggering energy efficiency in the public sector is carried out. Based on the successful previous building programme (30 % energy reduction in 95 % of all new one-family houses since 1993), the new programme features especially innovative public buildings.

The energy efficiency strategy for public buildings

THE PUBLIC BUILDINGS SECTOR

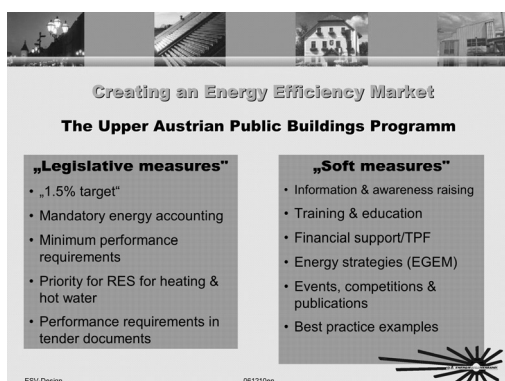
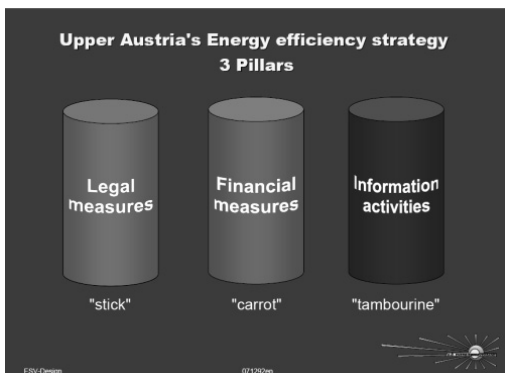
The public sector has an important role in achieving energy efficiency targets, especially in buildings. Public authorities (the municipalities, the regional government, the hospitals, etc.) are not only the owners & operators of (large) buildings, but due to their proximity to end consumers, their buildings and energy efficiency activities can also serve as a model for private households and businesses. In most countries the local com-

munities have an exemplary role in the construction legislation and are first contact point for private persons who want to build or renovate their homes.

In addition, due to the implementation of the EPBD, the publicity for public buildings is high.

By achieving the 1.5 % target in the public sector, not only can public money be saved, but also the central role that local level of administration can take is acknowledged and they can act as leading examples for “their” citizens. A number of Upper Austrian municipalities have already set themselves ambitious targets and are developing strategies and implementing projects to raise energy efficiency.

METHODOLOGY



The Upper Austrian energy efficiency strategy includes a number of measures targeting at the public sector, including amongst others:

- **Information & awareness raising activities:** including targeted information (brochures, website, hotline), media work
- **Energy strategies („EGEM – Energiespargemeinden“)** support programme for local authorities who want to develop and implement local energy efficiency strategies and action plans
- **Energy advice:** individual (on-spot) advice is given for communities, additionally so-called “Energy advice days” are organised in municipalities for citizens
- **Support for solar & biomass installations:** besides financial support, there are a number of different information measures offered
- **Information on biofuels for public transport:** information campaign on the use of biofuels for vehicles

- **Training activities:** a new training course for representatives from the local level was developed and implemented. The aim of the one-day training is to give people responsible for energy matters an up-date on recent technology and energy efficiency trends in the public sector
- **Events:** for example a series of seminars – “Breakfast for mayors” – is carried out in different districts and numerous other targeted information events aim at informing and motivating local decision makers
- **Competitions and publications:** regularly competitions for communities are carried out in order to motivate them to document best practice examples and to give them a platform to present what they already have achieved. Recent campaigns and competitions are for example “Energie Star 2007” (Upper Austrian energy award), “Solar Landesliga” (regional solar league).

MEASURES FOR THE PUBLIC BUILDINGS SECTOR

Focal point of the energy efficiency activities is the public building sector, most important measures are for example:

- **Minimum energy performance requirements for all new and renovated public buildings:** public buildings (office buildings, schools, kindergardens) have to achieve certain minimum energy performance requirements, with public funding linked to it, to ensure that these criteria are followed.

A/V*	Energy performance indicator (heating)
< 0,2	30 kWh/m ² ,a
> 0,8	55 kWh/m ² ,a
0,2-0,8	linear increasing 30-55 kWh/m ² ,a

Construction of new schools & kindergardens
* Surface/volume ratio of the building

A/V*	Energy performance indicator
< 0,2	35 kWh/m ² ,a
> 0,8	77,5 kWh/m ² ,a
0,2-0,8	linear increasing 35-77,5 kWh/m ² ,a

Retrofitting of schools & kindergardens
* Surface/volume ratio of the building

- **Energy performance requirements in tender documents:** the O.Ö. Energiesparverband supports communities in issuing tenders for new buildings or renovation. A list of energy related criteria to be fulfilled by architects and planners was developed and is now included in tender procedures. In the course of the tendering procedure, the O.Ö. Energiesparverband is very often a member of the jury to ensure that energy efficiency issues are taken into account. A number of very ambitious new construction/renovation projects have been realised with the support of O.Ö. Energiesparverband.

- **Legal obligation for energy accounting for municipalities:** as a result of the legal obligation for energy accounting for municipalities, energy consumption can be monitored, targeted measures developed and the results of their implementation documented. For example the following energy performance indicators (for heating in kWh/m²,a) are documented by the public administration:

Energy performance indicator - heating (kWh/m ² ,a)											
Type of building	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Schools for vocational training	112	104	99	97	98	95	97	84	88	85	87
Youth centers	200	180	160	154	151	140	156	147	148	143	156
Agricultural schools	126	118	118	124	123	116	107	98	105	96	100
Energy performance indicator - electricity (kWh/m ² ,a)											
Schools for vocational training		21	20	21	20	22	23	23	23	23	23
Youth centers		33	33	30	28	25	29	29	30	31	32
Agricultural schools		23	22	23	23	23	23	22	23	24	25

Example: Annual benchmarking

Legal obligation for renewable energy sources for heating and hot water supply

- **Third party financing programme:** The market development in the TPF field started with the first support programme – the ECIP Programme (“Energie-Contracting-Impuls Programm”) in 1998. Upper Austria was the first region in Austria to implement a subsidy scheme for TPF. The aim of the programme was to establish a positive framework for Third Party Financing projects. The ECIP programme supported the energy performance contracting in public buildings. So far more than 60 energy performance contracting projects were supported. The programme results are also very good in terms of economy: with about 1.3 million Euro subsidy, investment of about 15 million Euro was triggered. Besides the financial incentive, the programme offers also a number of advice and information activities. The combination of financial incentive with an information element (advice from experts) is one of the key factors for achieving successful implemented projects and for establishing a broad ECP market in the region. The ECP/TPF programme was developed and is implemented in co-operation with the regional administration.
- **Exemplary role of the region's own building:** due to their proximity to end consumers, community buildings (& related activities) can serve as a model for citizens. Municipalities are therefore encouraged to implement and document best practice examples.

EXAMPLES: ENERGY EFFICIENT PUBLIC BUILDINGS

As a result of the energy strategy and the implementation of a number of information and awareness raising activities, a number of energy efficient buildings have been built in communities recently, e.g.

“TZ Perg”:

- "Technology center" in Upper Austria
- low energy office building
- 3,000 m² heated area
- energy performance indicator for heating below 20 kWh/m²,a



“Passive house music school Wolfern”

- first passive house music school building in Upper Austria
- innovative energy concept, due to the high insulation and construction standard, now conventional heating system is required
- energy performance indicator for heating max. 15 kWh/m²,a



TPF project for public buildings

- Since 2003 TPF-projects for the public buildings owned by the Upper Austrian administration are being implemented.
- The recent TPF project includes 10 school & administration buildings
- over 600,000 € were invested and annually 58,200 € energy costs and 278 t CO₂ are saved.



Table 1: Energy accounting of the public buildings owned by the regional administration.

Building types	2000	2001	2002	2003	2004
vocational schools	97	84	88	85	87
district administration buildings	102	94	89	86	82
administration offices	103	94	100	96	97
agricultural schools	107	98	105	96	100
hospital	170	144	149	135	138

Source: Land OÖ, Abt. Gebäude- und Beschaffungs-Management

Results & outlook

With the Upper Austrian energy efficiency strategy the Upper Austrian government has clearly documented its political commitment to energy efficiency and the leading role public authorities play. The documentation of energy consumption is an important first step for monitoring, developing energy efficiency measures and for documenting what has been achieved in implementing them. See Table 1.

As a result of the annual benchmarking and monitoring for all buildings owned by the regional administration, it could be documented that

- the Energy consumption per m² (heating & hot water) decreased by 18.5 % since 1994
- Electricity consumption stable despite "more IT".

Barriers & Conclusions

Resulting from the experiences gained with energy efficiency activities in the public sector in Upper Austria since 1994, the following overview of crucial factors can be given and conclusions can be drawn:

- It is crucial that there are motivated and engaged people in public administration who are the driver for energy efficiency measures. If such persons are missing, it is very difficult to start and maintain the process. An example for this is the exemplary role the buildings owned by the regional administration play. There the process to monitor energy consumption already started in 1994 and due to a very motivated team of only few people responsible for the building management, since then, continuously efforts are under way to reduce energy consumption. On the other hand, for many municipalities it took quite a time (and some pressure by legal and financial measures) to convince them to implement energy efficient measures for their own buildings. Again, municipalities where one or two "drivers" are active, good results can be traced.
- Annual monitoring is very helpful to document results. Although documentation takes some time, it is a helpful instrument to show to others what has been achieved. In addition, it can be used for a kind of ranking and it boosts competition among municipalities (municipalities like to compare each other and every community wants to be somehow "better" than the neighbouring one).
- The work done has to be valued by somebody within the administration. As it is not easy to reduce for example the average overall energy performance indicator for a pool of

buildings, this should be valued by somebody. For example for the buildings owned by the regional administration, the results are published annually in the implementation report of the Upper Austrian energy strategy. By that, people working on energy efficiency measures, get some kind of publicity and reputation.

- As the public sector tends to be a slow acting one, legal instruments (as for example the following in Upper Austria: minimum performance requirements, obligatory energy y accounting, priority for renewables for heating & hot water, etc.) are very helpful. However, continuous promotion activities are required to get every municipality to know and follow these legal requirements. If it is possible, to connect requirements to public funding, this can accelerate the process very much.
- For new public buildings, the most efficient way is to include energy efficiency criteria already in tender documents. Again this took some time to be settled in Upper Austria, but now it is becoming a standard procedure and a very helpful instrument not to forget energy efficiency besides pure architectural criteria in the planning process of public buildings. Many innovative new public buildings have been built as a result of this.
- For the renovation of existing buildings, Third Party Financing turned out to be a very helpful instrument. Although it took some time to get to know among public administration officers, it is now a very well established instrument and also a very economic one (relation of public support and regional investment triggered).

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